

Claims

What is claimed is:

- 5 1. A method of compensating a pre-defined seek profile for use in a data storage device,
the method comprising:
- 10 defining an operating temperature threshold in the data storage device;
performing one or more seek operations at each of a plurality of initial data storage
device operating temperatures; and
obtaining a seek profile compensation value for each of the plurality of initial data
storage device operating temperatures sufficient to maintain the data
storage device operating temperature below the operating temperature
threshold.
- 15 2. The method of claim 1 further comprising:
determining a seek profile compensation function as a function of initial data
storage device operating temperature based on the seek profile
compensation values obtained.
- 20 3. The method of claim 2, wherein the determining operation comprises:
fitting the plurality of seek profile compensation values and the plurality of initial
data storage device operating temperatures to a curve.
- 25 4. The method of claim 3, wherein the fitting operation comprises:
calculating variables for use in a mathematical formula defining the curve.
5. The method of claim 2, wherein the determining operation comprising:
storing the seek profile compensation values for each of the plurality of initial data
storage device operating temperatures in a table; and

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determining the seek profile compensation function as a linear interpolation between the seek profile compensation values for each of the plurality of initial data storage device operating temperatures in the table.

5 6. The method of claim 1 further comprising:

determining a first seek profile compensation value for use when the initial data storage device operating temperature is within a first operating temperature range, the first seek profile compensation value being sufficient to maintain the data storage device operating temperature below the operating temperature threshold;

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determining a second seek profile compensation value for use when the initial data storage device operating temperature is within a second operating temperature range, the second seek profile compensation value being sufficient to maintain the data storage device operating temperature below the operating temperature threshold; and

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determining a seek profile compensation function to be the first seek profile compensation value when the initial data storage device operating temperature is within the first operating temperature range and the second seek profile compensation value when the operating temperature is within the second operating temperature range.

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7. The method of claim 6, wherein the first operating temperature range and the second operating temperature range overlap and the determining the seek profile compensation function operation comprises:

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if the initial data storage device operating temperature is within the first operating temperature range and the second operating temperature range, determining the seek profile compensation function to be the first seek profile compensation value if the operating temperature is increasing and the second seek profile compensation value when the operating temperature is decreasing.

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8. The method of claim 6 further comprising:

storing the first seek profile compensation value, the first operating temperature range, the second seek profile compensation value, and the second operating temperature range in a seek profile compensation table in the data storage device.

9. The method of claim 4 further comprising:

storing the variables calculated in the fitting operation in the data storage device.

10. The method of claim 1, wherein each seek operation includes performing seeks at a plurality of different seek lengths and the obtaining operation comprises:

compensating the pre-defined seek profile to obtain a seek profile compensation value for each of the plurality of initial data storage device operating temperatures and each of the plurality of different seek lengths sufficient to maintain the operating temperature below the operating temperature threshold.

11. The method of claim 10 further comprising:

determining a seek profile compensation function as a function of initial data storage device operating temperature and seek length based on the seek profile compensation value determined for each of the plurality of initial data storage device operating temperatures and each of the plurality of different seek lengths.

12. The method of claim 11, wherein the determining operation comprises:

fitting the plurality of seek profile compensation values, the plurality of initial data storage device operating temperatures and the plurality of different seek lengths to a curve by calculating variables for use in a mathematical formula defining the surface.

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13. The method of claim 10 further comprising:

storing the seek profile compensation values for each of the plurality of initial data
storage device operating temperatures and each of the different seek
lengths in a table; and

determining the seek profile compensation function as the linear interpolation
between the seek profile compensation values for each of the plurality of
initial data storage device operating temperatures in the table and the
plurality of different seek lengths.

14. The method of claim 12 further comprising:

storing the variables calculated in the fitting operation in the data storage device.

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15. A method of performing a seek in a data storage device comprising:

determining a seek profile compensation value from seek profile compensation information based on a current operating temperature;

compensating a pre-determined seek profile using the seek profile compensation value to create a temperature compensated seek profile; and

performing the seek operation using the temperature compensated seek profile.

16. The method of claim 15, wherein the seek has a seek length and the determining operation comprises:

determining a seek profile compensation value from seek profile compensation information based on the current operating temperature and the seek length of the seek operation.

17. The method claim 15, wherein the determining operation comprises:

monitoring recent changes in operating temperature; and

determining a seek profile compensation value by selecting a first seek profile compensation value from a table of a plurality of seek profile compensation values and associated operating temperature ranges based on the current operating temperature and the recent changes in operating temperature.

18. The method of claim 15, wherein the compensating operation comprises:

determining a second compensation value that is not based on operating temperature;

comparing the seek profile compensation value with the second compensation value to determine which is a most compensating profile compensation value; and

compensating the pre-determined seek profile using the most compensating profile compensation value to create a temperature compensated seek profile.

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19. A controller for a data storage device comprising:

a microprocessor; and

a means for compensating a pre-determined seek profile based on a current operating

5 temperature.

20. The controller of claim 19 where in the means for compensating comprises:

a means for compensating a pre-determined seek profile based on the current operating
temperature and a seek length.

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